

Information for students in Math 80350, Fall 2021

Instructor: Qing Han, 232 Hayes-Healy, 631-6834, qhan@nd.edu

Class Location & Time: DeBartolo Hall 119, 10:25-11:15am

References:

[1] L. C. Evans, *Partial Differential Equations*, GSM, Vol. 19, Amer. Math. Soc., Providence (1998).

[2] D. Gilbarg, N. S. Trudinger, *Elliptic Partial Differential Equations of Second Order*, Grundlehren, Vol. 224, Springer-Verlag, Berlin (1983).

[3] Q. Han, F-H. Lin, *Elliptic Partial Differential Equations*, Courant Lecture Notes, Vol. 1, Amer. Math. Soc., Providence (1997).

[4] Q. Han, *Nonlinear Elliptic Equations of the Second Order*, GSM, Vol. 171, Amer. Math. Soc., Providence (2016).

Syllabus: We will study elliptic partial differential equations of second order, with a focus on the linear theory. If time permits, we will study quasilinear equations. Main topics include:

1. The maximum principle (Chapter 3 [2] and Chapter 2 [3])
2. The Schauder theory (Chapters 4 and 6 [2] and Chapter 3 [3])
3. The De Giorgi and Moser iterations (Chapter 8 [2] and Chapter 4 [3])
4. The Krylov-Safonov's Harnack inequality (Chapter 9 [2] and Chapter 5 [3])
5. Quasilinear elliptic equations (Chapters 10 and 13-15 [2] and Chapter 2 [4])
6. The mean curvature equation (Chapter 16 [2] and Chapter 3 [4])

Prerequisite materials include Section 2.2 [1] (needed at the beginning of the class) and Chapters 5 and 6 [1] (needed after the fall break).

Class Meeting ID: This is the university assigned zoom meeting ID. You can use this to attend the class remotely. I will use this if I need to teach remotely.

Meeting Name: FA21-MATH-80350-01

Invitation Link:

<https://notredame.zoom.us/j/96821739072?pwd=eIRwWXVaS3NVQIN0bIk3Q0c5VXM4dz09>

Meeting ID: 968 2173 9072

Passcode: 6557445735